Grounds for Traverse

I. PRELIMINARY COMMENTS

A. Status of the case

1. This case is a national phase of a PCT application filed on Oct 01.03 claiming priority from an initial Italian application filed on Oct 01.02.

2. Preliminary amendments were filed on Oct 12.07 cancelling Claims 1 - 9 and entering Claims 10 - 21. The preliminary amendments also included a substitute specification and corrections to certain figures.

3. The present first office action, "OA1," mailed on April 11, 2008, rejects Claims 10 - 21 pursuant to 35 USC § 103(a) in view of:

Movassaghi, US Pat. 6,035,810 ("D1" herein), combined with

Chato, US Pat. 6,464,490 ("D2" herein)

B. The applicant

The sole applicant is FAMA Holdings, LTD, the exclusive assignee of all rights to the present application. As a result of the inventor's lack of cooperation, FAMA Holdings, Ltd filed a petition pursuant to 37 CFR § 1.47(b) to proceed without the inventor, which petition has been granted. Upon information and belief the inventor has not joined in the application pursuant to 37 CFR § 1.47(b). When the term "Applicant" or "the applicant" is used throughout this document, the terms refer to the assignee, FAMA Holdings, LTD.

C. Joint inventors

At paragraph 3 of page 2 of OA1 it is stated that the application names joint inventors. The applicant denies any knowledge of any joint inventor or any naming of joint inventors. Merhad Movassaghi is the sole named inventor. Consequently, because the applicant does not understand the allegations made at paragraph 3, page 2 of OA1, which allegations do not appear to be supported by the record, the applicant can not make an informed reply thereto. Applicant respectfully requests a supplemental non-final office action be entered pursuant to MPEP 706.07(a) that either corrects the assertion that joint inventors have been named, or, alternatively, sets forth the basis of the assertion in sufficient detail to permit Applicant to respond.

II. SUMMARY OF THE APPLICANT'S ARGUMENTS

A. OA1 fails to make a *prima facie* case for rejection for each of Claims 10 - 21. In some instances, entire claims have been ignored. In other cases the claim is mentioned but claimed subject matter has been ignored or mis-identified or rejected by means of conclusory statements that do not identify how or where the subject matter is disclosed by the prior art.

B. D1 and D2, when combined, fail to disclose all of the subject matter of any one of claims. Most significantly, neither reference discloses the intermediate coils of Claim 10. Nor are any elements disclosed in the prior art that have the same functions of the intermediate coils of Claim 10. Because the prior art does not disclose any element

that performs the same functions in the same way as the intermediate coils of Claim 10, the 35 USC § 103 rejections of claims 10 - 21 do not comport with the current standards for obviousness rejections as articulated by *KSR v. Teleflex* 127 S.Ct 1727; 82 USPQ2d 1385.

III. CERTAIN CLAIMED SUBJECT MATTER HAS BEEN IGNORED BY OA1

> The Administrative Procedures Act ("APA") requires the PTO to make a written record for every reason for rejecting each claim. There must be concrete evidence in the record to support the PTO's findings. *In re Zurko IV* 258 F3d 1379; 59 USPQ2d 1693 (FedCir, 2001).
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> The examiner bears the initial burden of presenting a *prima facie* case of unpatentability. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). MPEP 2100.

The following claims, claimed elements, or claimed limitations have been ignored by OA1. Consequently, a *prima facie* case has not been made for the rejections of these claims and this subject matter, and the rejections are not sufficient under *Zurko IV, Oetiker,* or the Administrative Procedures Act.

A. Claim 12 [new Claim 28] – the structural limitation of the intermediate coils being spaced apart so as to provide equal resistance to gas flow between each set of adjacent coils is ignored.

B. Claim 13 [new Claim 33] – intermediate coils circular. Entire claim ignored

C. Claim 14 [new Claim 23] – intermediate coils formed by flat coil of hollow tubing. Entire claim ignored.

OA1 addresses only **outer coils** being formed from flat coil of hollow tubing, which is a limitation the applicant does not claim. Furthermore, OA1 basis this rejection on the allegation of Page 3 that the **outer plates** of D1 are made of a flat coil of hollow tubing. This allegation is not correct. The outer plates of D1 are disclosed and claimed as being conical. D1, Col 4: Line 40 D1 discloses no flat plates or coils because in order to have sufficient volume for a combustion chamber in a 2-plate device there must be a central conical region. The applicant recognizes that the wording of Claim 14 is problematic. New Claim [23] more accurately claims the intermediate coils as being flat as opposed to being "formed by a flat coil," which was a mis-statement of the specification. See second paragraph of page 13 of the substitute specification – "formed as flat coils," and paragraph [0041] of the published specification "the flat coils." In any case, OA1 ignores flat intermediate coils.

D. Claim 15 – intermediate coils of stainless steel. Entire claim ignored

OA1 addresses only the **outer** plates being made of stainless steel, which limitation the application does not claim.

E. Claim 16 [new claim 25] – coolant inlet at the periphery of intermediate coil. Entire claim ignored.

OA1 addresses only **outer** plates having a coolant inlet, or having a coolant inlet at periphery, which is structure and limitations the applicant does not claim.

F. Claim 17 [new claim 26] – coolant outlet adjacent the center of intermediate coil. Entire claim ignored.

OA1 addresses only **outer** plates having a coolant outlet, or having a coolant outlet adjacent the center. D1 discloses the outlet of an **outer** coil, but does not disclose the outlet of an intermediate coil because D1 discloses no intermediate coil. Even with respect to the outlet of the outer coil, D1 does not disclose an outlet adjacent the center of the coil. D1 clearly discloses the outlet being at the periphery of the coil. Compare D1, FIG 1, **16** (Col 4, line 13) with FIG 3A, **52** (Paragraph [0041]) of the present application. D1 clearly teaches away from having centrally located outlets because D1 does not encompass the problem of how to cool intermediate coils.

G. Claim 19 [new claim 29] – the structural limitations of the burner cylinder having open end and closed end are ignored.

H. Claim 20 [new claim 30] – cone mounted in burner cylinder, base of cone proximate closed end of cylinder. Entire claim ignored.

I. Claim 21 [new claim 31] – nozzle assemblies affixed to the surface of a burner cylinder and a plenum accessing nozzle openings are ignored.

IV. CERTAIN CLAIMED SUBJECT MATTER HAS BEEN REJECTED ON THE BASIS OF CONCLUSORY STATEMENTS AND MIS-IDENTIFICATION

> Conclusory statements do not fulfill the PTO's obligation under § 103 and the APA. *In re Zurko IV, (supra); In re Lee* 277 F3d 1338; 61 USPQ2d 1430 (Fed.Cir., 2002) *cited by* MPEP 2144.03.
>
> [R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *KSR, ante*

The following subject matter has been rejected either because elements/limitations have been mis-identified, or because the elements/limitations are mentioned in a conclusory manner in which no attempt is made to identify where the subject matter is disclosed by any prior art reference or to provide any reasoning to support the conclusion of obviousness. Consequently, a *prima facie* case has not been made for the rejections of these claims and this subject matter, and the rejections are not sufficient under *KSR*, *Zurko IV*, or The Administrative Procedures Act.

A. Claim 10 – no central hub of the first outer plate is identified by OA1. Claim 10 claimed distinct hubs for each outer coil. OA1 refers only to the annular hub of the second outer plate.

B. Claim 21 [new claim 31] – radially spaced elongate slots of a burner. OA1 mentions slots without any indication of how or where such slots are disclosed by any reference.

C. Claim 19 [new claim 29] – burner cylinder. At page 3 OA1 mis-identifies the claimed burner cylinder as elements **100, 102,** and **108** and FIG **15** of D1. Neither FIG **15** nor the description of FIG **15** discloses any cylinder. Element **100** of D1 is identified at Col6, line 46 as being a "flame spreader." Element **102** of D1 is identified at Col6, line 48 as being a "burner hub." Furthermore, OA1 equates **102** with both an annular hub and a burner cylinder. That is clearly not possible. Element **108** of D1 is identified at Col6, line 49 as being a "fuel inlet." Neither a flame spreader, nor a burner hub, nor a fuel inlet, separately or in combination, have any structural or functional relationship to the burner cylinder of Claim 19. Furthermore, Claim 19 claims the limitations of the cylinder having an open end and a closed end. As noted above, these limitations are ignored by OA1.

D. Claim 21 [new claim 31] – nozzle openings in a burner cylinder. OA1 mis-identifies the nozzle openings of Claim 21 as elements **104** and **106** of D1. The clear

disclosure of D1 at Col6, line 49 is that element **104** is a spark plug and element **106** is flame sensor. A spark plug and an flame sensor have no conceivable relation to nozzle assemblies of Claim 21.

V. The Art of Record Does Not Disclose All of the Claimed Elements and Limitations

> A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art. *KSR, ante*

> "[W]hen a patent 'simply arranges old elements with each performing the same function it had been known to perform' and yields no more than one would expect from such an arrangement, the combination is obvious. . . . a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions." *KSR, ante*

Each and every claimed element must be disclosed in the prior art that is combined against the applicant's claims pursuant to a § 103 rejection. Furthermore, the elements of the prior art must perform the same function that the elements perform in the rejected claim. The applicant respectfully submits that the prior art of record does not disclose intermediate coils that conduct a coolant, nor does the prior art of record disclose any element of the prior art that performs the same functions in the same way as the applicant's intermediate coils or solves the same problems solved by the applicant's intermediate coils.

Intermediate coils represent subject matter claimed in rejected independent claim Claim 10 and it's amended version, new Claim 22. OA1 alleges that the claimed intermediate coils are obvious in view of the outer conduit coils of D1 combined with the solid annular plate units of D2. The applicant respectfully disagrees and traverses this ground for rejecting Claim 10 for the following reasons:

A. Applicant's intermediate coils provides solutions to problems the prior art does not even address.

Applicant submits that a major problem solved by this invention is how to extract the maximum amount of heat from a pulse combustor given the practical limitations in the radius of the tailpipe region, the thermodynamic constraints imposed by the overall geometry of the pulse combustor, and the costs of construction.

If one simply moves the outer plates or coils farther apart to increase the volume of the combustion chamber, one exceeds the inter-plate distance that produces the tailpipe effect, which is critical for the pulsating combustion phenomenon. On the other hand, providing a plurality of tailpipe regions by stacking plates that are solid and not cooled, as in D2, results in a device from which heat cannot be adequately extracted and which, depending on the number of plates, could overheat, resulting in the loss of the pulsating effect, and possibly damaging the device.

The applicant's intermediate, coolant-cooled coils represent a unique and commercially successful solution to the problem of how to increase the volume of a pulse combustor and yet maintain the pulsation effect. Unlike the outer coils of D1 and

the solid, intermediate coils of D2, the intermediate cooled coils of Claim 10 provide all of the following functions, which solve the various problems inherent in the prior art.

i) increasing the volume of the combustion chamber by increasing its linear dimension, thereby producing more heat;

ii) maintaining tailpipe regions even as the linear dimension increases, which tailpipe regions are critical for the operation of the pulsating combustion effect;

iii) extracting heat from the multiple tailpipe regions;

iv) cooling the intermediate coils to prevent overheating.

As noted at page 4 of OA1, *KSR* requires that solutions be *identified* by the prior art before that art can render the claim obvious. The present invention, in fact, represents a significant and non-obvious step forward in the field of pulse combustors because the intermediate, cooled, coils provide the foregoing solutions that had not been previously identified by the prior art. Because the problem solved by this invention were not addressed by the prior art, the applicant's solutions could not and were not identified in the prior art. Consequently, the obviousness rejection is not sustainable under *KSR*. The solution provided by the present invention is so effective, in fact, that the applicant produces and sells pulse combustors employing up to 50 intermediate coils and devices producing an output of almost 12 million BTU/hr.

B. <u>The outer coils of D1 are not equivalent to the applicant's intermediate coils</u>

OA1 alleges that the two outer coils of D1 are structural equivalents of the applicant's intermediate coils. (Although there are only two of such coils disclosed in D1, these coils are referred to as "outer" to facilitate discussion and comparison with the outer plates of Claim 10.) OA1 further alleges that the applicant's intermediate coils are no more than duplications of the outer coils of D1. The applicant respectfully disagrees.

Applicant acknowledges that in certain respects the coils of D1 are structurally and functionally related to the **outer coils** of Claim 10. For instance, both sets of outer coils include the hub element for accommodating the burner and both sets of outer coils define the linear boundaries of the combustion chamber. Also, the hub of one of the outer coils of D1 couples with a burner and, likewise, one outer coil of the present invention couples to a burner (**12**). In addition, the outer coils of D1 have a central conical region and the outer coils of Claim 24 may have such a central conical region. Since the volume of the combustion chamber of the present invention is increased by means of intermediate coils, the conical regions of the outer coils is optional. It is not optional in the invention of D1.

By contrast to the outer coils, the intermediate coils of Claim 10 as disclosed and claimed are both functionally and structurally distinct from the outer coils of D1. The intermediate coils have no hubs (Paragraph [0038]). They have a "wide opening" instead of a hub (paragraph [0041]). Nor do the intermediate coils have any means for coupling to a burner. Were the applicant's intermediate coils to have hubs coupled to a burner, or any hub at all, it would not be possible to access the coolant outlets of the

intermediate coil, which are disclosed and claimed as being at the center of the intermediate coils.

As noted above, the outer coils of D1 are disclosed as having central conical regions (**82**). These conical regions are critical to D1 in order to provide sufficient space between the coils for a central combustion chamber, while at the same time maintaining a narrow, outer, tailpipe region. D1 discloses that this space is 2.34 inches between the conical regions [Col4:line 44] as compared to 0.4 inches between the tailpipe regions [Col4: line 40]. These conical regions distinguish the outer coils of D1 from the intermediate coils of Claim 10. Such central conical regions are not required, necessary, disclosed, or claimed with respect to the intermediate coils of Claim 10.

At the time he applied for the patent that issued as D1, Movasssaghi, the named inventor of both D1 and the present invention, was not able to overcome the technical problems for providing a plurality of cooled intermediate coils. Consequently, in D1, Movasssaghi limited his invention to just two opposing outer coils. In comparing FIG 4A of the present application with FIG 3 of D1, the increased structural complexity necessary to provide cooled intermediate coils as opposed to just outer coils is visually evident.

For these reasons, the outer coils of D1 are structurally distinct from the intermediate coils of Claim 10. Nor do they perform the same functions as the intermediate coils.

C. <u>The solid plates of D2 are not equivalent to the intermediate coils</u>

The solid plates of D2 are also clearly not equivalent structurally or functionally to the intermediate coils of Claim 10. While the applicant agrees with OA1 that the geometry of intermediate coils of Claim 10 is superficially similar to the geometry of plates of D2 in that they are both annular, these similarities do not render the elements functionally or structurally equivalent.

Obviously, the structure of the solid plates of D2 is distinguishable from the coils of Claim 10. From a functional perspective, the plates of D2 are even more clearly distinguishable from the present invention in that they do nothing to extract energy from the combustor. It is neither disclosed nor implied what problems the solid plates of D2 are proposed to solve, but what is clear is that they do not attempt to solve the same problems solved by the present invention. For instance, the solid plate elements of D2 impose severe restrictions on heat dispersion and heat extraction – restrictions that D2 makes no attempt to address, much less overcome. D2 is entirely silent on the issue of how heat is extracted from the solid annular plates, or from the tail pipe region, or from the pulse combustor as a whole. It is evident that the inventor of D2 was not able to conceive of a way to actively extract heat from his intermediate plates – a problem solved by the applicant's intermediate coils.

D. Combining D1 and D2 does not result in intermediate coils

According to the US Supreme Court's clear instructions in *KSR*, in order to reject a claim under § 103, the Patent Office is required to identify elements in the prior art that perform the same function and produce the same result as the elements of the

rejected claim. Each of the applicant's claimed elements must exist in the prior art and must perform the same function in the prior art that they do in the claimed device.

With respect to Claim 10, *KSR* requires that the Patent Office articulate some element in D1 or D2 that performs all of the functions of and produces the same results as the intermediate coils of Claim 10. The applicant respectfully submits that it is not sufficient to synthesize claimed elements that do not exist in the prior art from features and limitations of disparate prior art elements. In order to find Claim 10 obvious pursuant to § 103, the examiner must cite prior art that discloses fluid-cooled intermediate coils. Combining the outer coils of D1 with the solid plates of D2 does not produce the device of Claim 10, it produces a burner having cooled outer coils and solid, non-cooled inner plates; i.e., a burner that would likely overheat and fail and whose heat extraction would be limited or nil.

E. Multiplying the outer coils of D1 does not render the applicant's intermediate coils obvious

OA1 argues that the intermediate coils are merely the two coils of D1 multiplied or duplicated. Applicant respectfully argues that this duplication of parts argument fails for a number of reasons.

First, in making this argument, OA1 states: "As regards one of the intermediate plates including cooling passageway, it should be clear that **all of the plates** of Movassaghi [D1] include a coolant passageway." [OA1, Pg 4, emphasis added]

By referring to "all of the plates of Movasssaghi" OA1 connotes that D1 discloses or even allows for more than two plates. This is not correct. A more accurate statement of the facts would be "**both** of the plates of Movasssaghi include a coolant passageway" because D1 does not claim, disclose, or imply any more or any less than two coils, whereas the present application does not claim or disclose less than three coils.

Second, The multiplication/duplication ground for rejection is not applicable when the prior art element that is duplicated to meet the claim must be modified, as is the case here. D1 does not disclose any elements that can be multiplied without modification to meet the intermediate coils of Claim 10.

Consequently, it is not possible to merely multiply the two coils of D1 to meet the intermediate coils of Claim 10 without first modifying the coils of D1 to remove the conical portions, remove the hubs, and provide wide openings. OA1 offers no explanation of how or why it would be obvious to modify the plates of D1 to meet the intermediate coils of Claim 10. In fact, such modifications are not possible without altering the principle of operation of D1 because once one has removed the conical sections and hubs of the coils of D1, they can no longer serve their purpose of providing a combustion chamber because 1) there would only be 0.4 inch between the coils at all points and 2) there would be no hubs with which to couple to the burner and flame spreader. The modification of D1 required to meet the applicant's intermediary coils would rendered D1 non-functional.

F. The applicant's invention produces synergistic effects relative to a combination of D1 and D2

In support of the argument that the intermediate coils of Claim 10 are merely a duplication of the coils of D1, OA1 cites the case of *St. Regis v Bemis* 549 F2d 833, 193 USPQ 8 (7CA, 1977) for the proposition that "to provide duplicate parts for multiplied effect is not the type of innovation for which a patent is granted." The case appears to be mis-cited. *St. Regis* does not mention duplicate parts or multiplied effect. What *St. Regis* stands for is the proposition that a synergistic effect caused by the combination of known elements indicates that the combination is not obvious under § 103.

In the present case a synergistic effect is produced by providing multiple parallel cooling coils in a pulse combustor, the synergy occurring in the power output because not only is the volume of the combustion chamber greatly increased but the large amount of heat that is produced in the larger combustion chamber is effectively and efficiently extracted by the coolant-based cooling system.

By contrast, a combination of D1 with D2 does not produce the device of Claim 10 or a device that yields the synergistic results of the device of Claim 10. Combining D1 with D2 produces a device having coiled outer plates and solid intermediate plates from which the increased amount of heat cannot be extracted. Such a combination results in a device that not only lacks the synergistic results of the present invention, but a device that would likely malfunction, explode, or melt from being overheated.

VI. Conclusions

A. This case is now in condition for allowance

The applicant acknowledges the many helpful observations and comments of OA1, and the applicant has relied on those observations and comments to amend the claims, the specification, and FIG 4A in order to disclose and claim the invention more clearly and precisely. For the reasons set forth above, the applicant respectfully submits that the prior art fails to disclose each and every element and limitation of the applicant's claims. Nor does the prior art disclose elements that perform the same functions in the same way as the applicant's claimed elements. Consequently, the applicant requests that new Claims 22 - 32 be deemed allowable and letters patent be granted thereon.

B. If the case is not deemed allowable, a new non-final office action is required

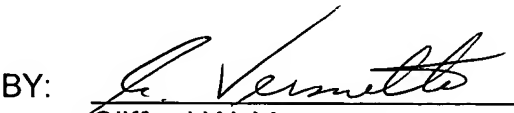
The applicant respectfully notes that although the Summary of the Office Action indicates that all of Claims 10 - 21 stand rejected, the Detailed Action does not mention many of the claims and much of the claimed subject matter. As detailed above, OA1 omits any explanation of how the prior art renders obvious every element and limitation claimed. Should the examiner not agree that the case is now in condition for allowance, Applicant respectfully submits that the omission by OA1 of any grounds for rejecting claimed subject matter amounts to a failure to articulate a prima facie case of unpatentablity. Furthermore the Patent Office's responsibility to make a written record of the grounds for rejecting each claim has not been fulfilled and the burden to rebut

this "rejection" has not yet shifted to the applicant. *In re Zurko*, 258 F.3d 1379, 59 USPQ2d 1693 (Fed. Cir 2001) Consequently, any further office action rejecting this subject matter cannot properly be made final since only with a non-final action would the applicant be able to properly respond to the rejection. MPEP § 706.07(a)

Respectfully submitted,

Date: June 27, 2008

FAMA Holdings, Ltd.,
Applicant

BY: 
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